The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society
https://lvaas.org/
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December 2024
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Via Sandy Mesics, Programs Chairperson

Upcoming LVAAS General Meeting Speakers

December: Emma Page (Lehigh U) will speak in person:"Hunting Exoplanets Transiting Evolved Stars Using Machine Learning" A Zoom link will also be provided.

January: Greg Crinklaw from Skytools will be speaking via Zoom. The topic is TBA.

- Please contact **astrosandy@gmail.com** if you have ideas for speakers, or would like to do a talk.

Via Benjamin Long, LVAAS Director

Bonnie Buratti, NASA's Europa Clipper Deputy Project Scientist and LVAAS member was interviewed during the Europa Clipper launch event October 14th. **Watch** (34:49)

Also, being very long overdue, LVAAS has re-keyed almost all of the locks on our properties. To request replacement keys, please contact the "Key Coordinators" listed on our website's Contacts page.

Via Blaine Easterwood, Education Director and Rich Hogg, Membership and Technology Director

Plans are now in place for our annual December Holiday Party/General Meeting to be held at the Da Vinci Science Center on Sunday, December 8 from 1-5 p.m. **Specifics can be found on our website**, and you should also have received an email from LVAAS' Rich Hogg on December 1. Come celebrate the holidays with us!

KUDOS! THANK YOU, LVAAS VOLUNTEERS!

Pulpit Rock Observatories Director **Frank Lyter** would like to thank our members who stepped up to help with the painting projects underway at our dark sky site, Pulpit Rock Astronomical Park. Those participating in the sprucing up are **Bruce Balthaser, Phillip Doherty, Andrew Heilman, David Lorchak, Cedric Lumsden, Louis Velez, Earl Pursell, Kyle Kramm and Bob Weiss.** Kudos, volunteers! LVAAS thanks you!

Via France Kopy, Editor

The Observer is always looking for new thoughts and ideas for improvement in 2025 and beyond. If you'd like write an article, now's the time! Have an idea for a new feature? Contact me to discuss it! Maybe you write sci-fi or do space art? Let's talk! Maybe you have your own ideas for something completely new and interesting. Let me know! **observer@lvass.org**

Via Earl Pursell, UACNJ Liason

Public Program Nights are in recess for winter at United Astronomy Clubs of New Jersey. UACNJ has its own YouTube channel and the schedule of videos is on its website. Please visit uacnj.org to watch and /or subscribe.

cover: **"Curiosity" Watercolor and Acrylic, by Audrey Christiansen**

Audrey is thirteen and lives in Lafayette, Indiana. She has always had an interest in astronomy and the night sky. A couple of days after meeting LVAAS member Paul Tracy at a 2024 Solar Eclipse viewing, Audrey decided to get out her brother's telescope and look up to the sky. She was inspired to paint the silhouette of a young girl with her telescope looking up at the stars from pictures taken of her while using the telescope in her backyard. Thank you Audrey!

LVAAS General Meeting & Holiday Party!

Sunday, Dec. 8, 1-5 p.m. at Da Vinci Science Center

Please see specifics at lvaas.org

"Hunting Exoplanets Transiting Evolved Stars Using Machine Learning"

***in person and via Zoom**

presented by

Emma Page

Only ~6% of known transiting planets orbit evolved host stars. Discovering more will allow us to test if the population of planets orbiting main sequence stars is similar to those orbiting evolved stars. Our team developed the *giants* pipeline, which reduces Transiting Exoplanet Survey Satellite (TESS) light curves to search for long duration, shallow transits around evolved stars. We combine observational parameters from the Box Least Squares (BLS) algorithm with host star properties as input parameters, and train a random forest model to categorize light curves as potential planet candidates or non-detections. From 90,000 targets, the model categorizes ~3,000 as transit candidates. We analyze the sample of 3,000 predicted candidates to further vet the light curves and choose targets for follow up observations. Using this planet hunting method, we identified ~300 eclipsing binary star systems and discovered ~30 new planet candidates transiting evolved stars.

Emma Page *grew up in Phoenix, AZ and discovered she loved physics and math at a young age. She attended Austin College in Sherman, TX as an undergraduate. During this time, she fell in love with astronomy research at the Adams Observatory while collecting follow-up photometry for exoplanets. Now, Emma is a Physics PhD candidate at Lehigh University and is expected to graduate in May of 2025. As a graduate student, she contributes to publications on the discovery and population analysis of exoplanets, brown dwarfs, and eclipsing binary stars. Emma specializes in python and machine learning applications for astronomy as a part of her PhD. She is currently applying to post-doctorate jobs and hopes to continue applying her machine learning experience to large astronomical datasets. When not working, Emma is hanging out with her dog Oberon, cooking up a storm, and painting as much as she can.*

Prospective new members who wish to attend the meeting please email membership@lvaas.org.

Minutes from the LVAAS General Meeting – November 10, 2024

The November 2024 LVAAS General Meeting was conducted electronically using an online service and at the South Mountain headquarters. Approximately 45 people were in attendance.

Director Benjamin Long opened the meeting at 7:02 p.m.

Tonight's General Meeting's presentation was " Lore of the Ancient Skies" featuring Dave Moll.

Dave Moll, a native of Bethlehem, first joined LVAAS in 1964. He has served as Assistant Director and as a board member for many years. Dave attended Notre Dame High School - Green Pond and The Pennsylvania State University, where he earned a BS in Earth & Space Science Education. He also attended the University of Alaska where he earned an AAS in Petroleum Technology, and he did post-graduate work in Higher Education Administration and Crisis Leadership at Harvard University's Graduate School of Education and the Kennedy School of Government.

A retired University administrator, Dave worked at the University of Alaska as Statewide Manager, Environmental Health & Safety, and at California State University, where he was Assistant Vice President, Risk Management & Sustainability. After 34 years of being (far) away in Alaska and California, Dave returned to the Lehigh Valley and re-joined LVAAS in 2010.

Dave is married to Carol Moll, who Dave describes as "A wonderful wife with a high tolerance for astronomy equipment purchases."

Humans have tried to explain things in the sky with myths, legends, folklore and spiritual beliefs. The first astronomers, the Sumerians, would note the sky around 5000 BCE, called the Age of Aries. They divided the sky into 12 circles and the ages corresponded to the location of the sun on the vernal equinox. Around 3000 BCE they first grouped stars into constellations. The first day of the year was the first day of Spring, the vernal equinox. They practiced long-term astronomy, watching the night sky over long periods of time. It was noted that one star, the pole star, never moved. Position in the sky was thereafter noted with a reference to the pole star. In the second century AD, Hipparcus noted the precession of the planets.

In ancient Egyptian astronomy, the pyramids line up with a face due north toward the pole star, and the layouts seem to follow a celestial alignment. Hipparchus observed consecutive equinoxes to precisely

measure the length of the year, and he compared his findings to data from the 5th and 6th centuries BC. Wobbly earth leads to a wandering pole with a 26,000 year period. Vega will be the pole star in 14,000 CE. The ages are Leo, Cancer, Gemini, Taurus, Aries and Pisces depending on where the sun is on the vernal equinox. We are currently in the Age of Pisces, 1 CE to 2150 CE. Sumerian & Babylonian astronomy had priests observing from the tops of temples. The first star catalog was in 1600 BCE. Each significant celestial body was ruled by a god or deity. They used a 7-day week, with each day controlled by a god. In the Epic of Gilgamesh, written 1200 BCE, the story of the slaying of the Bull of Heaven was told.

Ancient Chinese astronomy did not study planets as they moved as they did not feel they should be messed with. In 1054 AD they noted a supernova (not knowing what it was) which corresponds to the Crab Nebula. They determined the year was 365 ¼ days long.

Ancient Greek astronomy had a blank at the south celestial pole. Ptolemy developed the geocentric model that remained in use for 1400 years. Perseus killed Medusa and took the eye to hold for ransom. Al-Ghul, the Demon Star in Perseus was a variable star with a period of 2.85 days and was felt to be the eye.

Native American astronomy saw a battle between summer and winter in the stars of Orion. The Iroquois saw a bear only in the bowl of the Big Dipper. Medicine wheels were used as observational aids. Unsure today how they worked; they are similar to Stonehenge.

Celtic astronomy had the first full moon after the vernal equinox celebrating the festival of Oester - now Easter. Festival of Samhein was October 31, and the new year began November 1. The day began at sundown. Newgrange at Bru na Boinne was one of 3 passage tombs. These are over 5000 years old, and were built by a pre-Celtic civilization. Light shafts only allow light on the equinoxes.

Viking astronomy was used for navigation. Vikings used the Sun Stone - the Horizon Board - aligned to the rising and setting sun, and Shadow Pins depicted east and west, with north in between.

Sky myths were educational tools, including myths of the Milky Way. There were also moon myths, e.g. the Chinese believed in the woman who lives on the moon. There were many myths and legends of the sky. The Egyptians thought, Ra, the sun god, dwelt in the underworld at night. Eclipses were mostly thought to be battles between the sun and moon. The first predicted eclipse was on May 28, 585 BCE. Many remnants from the ancient astronomers are still with us today.

After questions were taken, a Business Meeting was called to order by Benjamin Long at 8:11 p.m. to discuss the 2025 budget. After taking questions, the budget was approved by unanimous vote of the members present. The business meeting was adjourned at 8:14 p.m.

The informational meeting resumed at 8:32 p.m.

Membership: Rich Hogg

- The following members completed their second readings and are now full members:
  John Bonaventure
  Janine and Tyler Bonham (family membership)
  Dr. Becky Frank
  Tadd Kehler
  Ron Kline
  Kim and Jeff Pinegar (family membership)
- The following members completed their first readings:
  Tad Andrews
  Doug Dietrich and Rachel Paul (family membership)
  Ben Holland
  Stephanie and Gordon Johnson (family membership)
  Denise Summa amd William Barnes (family membership)
- The following members have previously completed a first reading and are still eligible to complete a second reading to become full members:
  Robert Cottignies
  Thomas Finan
  Stephen Huber
  Michael Williams

Astroimaging - Tom Duff:

- Next meeting of the AstroImaging group is scheduled for December 7, 2024 at 7:00 p.m. at South Mountain HQ. If you have any interest in imaging no matter your skill level, you are welcome to attend.
- We then take a winter break and will resume these meetings in April 2025.

South Mountain Maintenance – Bill Dahlenburg

- We are always looking for help. We are usually here on Saturday mornings for help with your telescopes or if you would like to tour the facilities. Please contact Bill to confirm someone will be there before arriving.
- We have multiple telescopes and cameras for rent. Contact Mike Clark or Jamie Elovski for any questions.

Stargazers Group - Kyle Kramm

- We have had the last meeting for the year. Meetings will resume in April of 2025.
- Meetings are held on the second Friday of each month at South Mountain HQ starting at 7:00 p.m.
- There is no set agenda and this is an excellent opportunity to get help with your equipment or to learn how to use the LVAAS observatories or rental equipment.

LVAAS Calendar - Mike Huber

- We are working on an LVAAS physical calendar for 2025 with LVAAS images each month. If you are interested in getting involved, or if you are interested in purchasing you can contact m.huber614@gmail.com

Next General Meeting:

- The next general meeting will be on Sunday December 8, 2024 and this will be the Holiday Party. More information will be sent.
- We will plan to have our meetings for January through March on the Muhlenberg College campus. Further information will be coming.

The November 2024 General Meeting was recorded.

The meeting was adjourned at approximately 8:48 p.m.

Submitted by Joe Zitarelli, Secretary

Royal Astronomical Society of Canada's

Observer's Handbook

For over a century, the Royal Astronomical Society of Canada has published the *Observer's Handbook* annually, solidifying its position as the indispensable reference book for anyone with an interest in astronomy. Whether you're a seasoned astronomer just starting your cosmic journey, or an educator sharing the wonders of the universe, this book is an indispensable resource tailored to your needs. This expansive guide, spanning more than 350 pages, offers an extensive compendium of forthcoming astronomical events and invaluable reference materials. The US edition of the *Observer's Handbook* includes content tailored to American audiences, featuring American cities, more southern astronomical events, and American spelling.

I will be ordering the USA version from the Astronomical League. The price to order one copy is $27 + $7 S&H, but only $26, with free shipping, on orders of 10 or more! Hopefully at least 10 of you are interested in getting the 2025 copy of this very useful reference book! As an added bonus, this year's cover photo was submitted by LVAAS' own **Mike Huber**, which makes this one practically a collector's item! And you might even be able to get him to autograph it!

If you are interested in receiving a copy, please email me at ej_pursell@yahoo.com and put "Observers Handbook" in the heading. If we can get 10 or more requests, I will place an order.

Thanks,

Earl Pursell, Planetarium Director

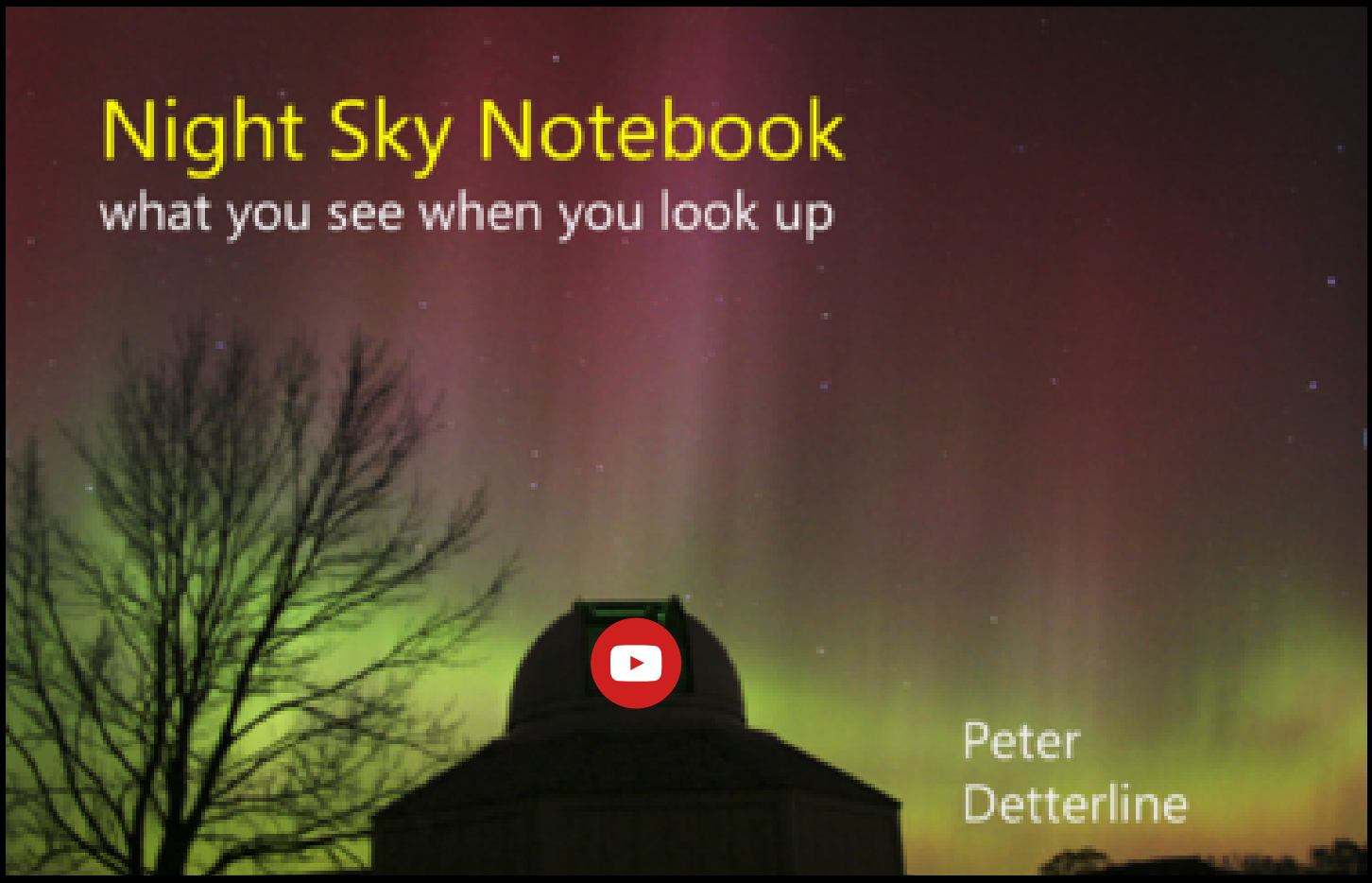
Our mailing address is:

Lehigh Valley Amateur Astronomical Society
620B E Rock Rd
Allentown,PA 18103-7525

Peter Detterline's

Night Sky Notebook

December 2024



A Troubled Genius and the "Gallivantin' Grandma"

By Sandy Mesics

When I research the LVAAS archives for material for this column, I generally look at what was going on fifty years ago. In December, 1974 prolific author Rodger Gordon wrote a column in *The Observer* about Craters on Mars. In the article he claimed that two astronomers, E.E. Barnard and John E. Mellish observed Martian craters visually using the Yerkes Observatory 40-inch refractor.

While I thought this topic was interesting, it paled in comparison to the biographical information I gleaned about John Mellish, his wife and his family. Subsequently I went down the rabbit hole and this column is the result. I should warn you that if you're offended by tales of incest, stop reading now.

JOHN E. MELLISH

Wisconsin State Journal June 5, 1932.

John E. Mellish was born in Cottage Grove Wisconsin in 1886. As a young boy, he was given a $2 telescope at Christmas. When he outgrew this scope, he bought another for $19. When he had outgrown that one, he spent a year building his own. 21-year-old Mellish was observing with one of his home-built telescopes when he saw a comet. He wrote to Yerkes Observatory telling them of its location and asking them the name of the comet. They replied that there was no such comet there. That is how Mellish discovered comet Grigg-Mellish in 1907. By the time he was 24 he had discovered two comets using telescopes he had built. Mellish would eventually go on to discover three more comets. Despite these discoveries his real contribution to astronomy would be as an optician and telescope maker. He was self-taught, having never attended college. Reportedly, Mellish was quite a naturalist, with an immense knowledge of geology, flowers, and birds. Mellish so impressed the staff at Yerkes that he spent six months there as an assistant. Despite all these accomplishments, his story would have been bland had it ended there. Instead, here is where it gets interesting.

In 1915, at age 29 Mellish answered a personal ad in a Chicago newspaper that read: "Wanted: A perfect husband, one who wants the happiness not of a day but of a lifetime, who would receive the fullest pleasure in staying home at night talking to me and would be just as wrapped up in me as his work."

The ad was placed by Jessie Wood, described as "black-haired, black-eyed, vivacious and large for a woman." By contrast, Mellish was described as weighing about 100 pounds, with greying hair, a bald spot, and possessing a "lean, sensitive face [that]

accords with his soft, apologetic voice." The pair would wed, and the union would produce eleven children (some sources say twelve), nine of whom would survive. The first child was born at Yerkes Observatory, and there being no physician or midwife available, Dr. Edwin B. Frost, head of Yerkes Observatory, and Mrs. Frost delivered the baby girl.

Hope [Arkansas] Star, June 23, 1932

Mrs. Mellish later said that instead of "staying home at night and talking" to her, Mellish spent all his time at his laboratory and neglected her. She brought suit for divorce, charging cruelty and claiming he forced her to bear eleven children. At about the same time, in September 1931, Mellish was indicted for molesting his 15-year-old daughter. Mellish apparently confessed to this crime and subsequently he faced 20 years' imprisonment. But because of Mellish's scientific accomplishments, a group of scientists lobbied that he be spared the sentence or be forced to serve it at night, while continuing to work in his laboratory grinding mirrors and lenses during the day. His supporters maintained that "Although he could have been rich, he preferred to labor in obscurity. He worked 18 to 20 hours a day, and when he was arrested, scientists claimed his labors had broken him down." Another alternative that was considered was to build Mellish a laboratory within the state asylum at Chester Illinois, where he was expected to be confined. While awaiting his sentencing Mellish was allowed to work in his laboratory in St. Charles, Illinois during the day and spend his

nights in the county jail at Geneva. However, this agreement was rescinded after Mellish reportedly went to Aurora without permission.

Astoundingly, Mellish would never serve a prison sentence for this crime. Instead, he was released on April 14, 1933, in the custody of a California scientist who said he would be responsible for him. "He is one of the three best lens-grinders in the world, and astronomers come to him for lenses no one else can build for them." according to Clarence L. Friend, an Escondido amateur astronomer in 1934. It is quite possible that Friend was the person to whose custody Mellish was released. In 1934, Mellish settled in Escondido, California. Oddly, the Escondido Daily Times-Advocate reported that "… his wife and eight children will move from Chicago to Escondido soon." Reportedly, Mellish was sought out by Corning Glass Works to help fabricate the 200-inch telescope, and he was also reported to be sought out to help cast a 72-inch telescope mirror for the University of Texas. Likely this was the 82-inch Otto Struve telescope. There is no evidence that he actually worked on either optic.

GRANDMA IS A HAPPY WANDERER—Mrs. Fern Woods, 60, of Escandido, Calif., pauses in New York after she completed a hitch-hiking journey to New Orleans, returning via San Diego, San Francisco, El Paso, Tex., Denver, Omaha and Chicago. Mrs. Woods is the mother of 12 and the grandmother of 32. Her jaunts on the road for the past five years have taken her as far as Alaska.

North Bay Nugget April 2, 1958

After Mrs. Mellish was granted a divorce and custody of their eight children, she hitchhiked all over the United States, including Alaska, under the name Mrs. Fern Woods. She became known as the "Gallivantin' Grandma." When she was interviewed by reporters, she claimed to be a widow with 12 married children and 27 grandchildren and gave Escondido as her home address. It wasn't until 1952 that the Escondido Daily Times-Advocate revealed that she was Mrs. Mellish.

In 1936 the Escondido Daily Times-Herald reported that John Mellish left Escondido for a 60-acre ranch in Broken Arrow Oklahoma, accompanied by his aged mother and daughter Jesse. It seems that if this was true, Mellish did not remain there very long, because in 1938, Mellish was in hot water again with the law back in California. He and his son Trevor were arraigned in superior court in San Diego, charged with contributing to the delinquency of two young girls who were seeking to elude authorities. Mellish and his son were found guilty.

During World War II, Mellish aided the war effort by using his skills to mass produce spectrographic equipment for laboratories of vital industries. During the war years he produced 30 sets of equipment annually and said that he once worked on a rush job for 36 consecutive hours. However, Mellish found himself in trouble yet again in 1944, charged with grand theft involving removal of ore from the Tourmaline Queen gem mine at Pala, northeast of Escondido. The author could not find out how this incident ended.

After the war, Mellish resumed his practice of speaking to local groups about astronomy and lens making. He would occasionally host scout troops for observing and tours of his workshop. In 1951 it was reported that he was working on six 37-inch lenses for the University of Texas physics laboratory.

In 1958 Melish moved from Escondido to Cave Junction Oregon. In May 1964, when he was 78 years old, a fire at Mellish's home in Oregon destroyed valuable grinding tools, lathes, a collection of valuable cameras and cut gems, including a pair of 16-inch lenses he was fabricating. It also destroyed drawings of the craters he had made in the early 1900s. After the fire Mellish traveled over the country, staying with his eight children and visiting with his 29 grandchildren and nine great-grandchildren. He eventually returned to Escondido.


JOHN E. MELLISH

Mellish corresponded with LVAAS member Walter Leight from the 1930s to the 1960s and he also made an eleven-inch refractor for Leight. In a 1966 letter to Leight he confirmed that he did indeed observe craters on Mars: "The biggest crater I saw was about 200 miles in diameter, about twice the diameter of the largest crater shown in the satellite [Mariner IV] pictures." In 1968 Mellish was an honored guest at the ninth anniversary of the Astronomers Club of Escondido. The Daily Times Advocate reported that; "He spoke of unusual meteors he had observed, features of the comets he had discovered and his observations of the craters on Mars with the Yerkes Observatory 40-inch telescope in 1915."

Mellish died on July 13, 1970, in Medford, Oregon at the age of 85. The ultimate fate of the "Gallivantin' Grandma remains a mystery.

References

The Observer, December 1974, February 1975.
The Wisconsin State Journal, Sunday, June 5, 1932, May 14, 1934.
The Madison Wisconsin Capital Times, June 19, 1932.
The Waukesha County Freeman, May 12, 1933.
Escondido Daily Times-Advocate October 27, 1934, May 9, 1936, December 28, 1938, January 28, 1944, March 28, 1952, September 9, 1952, August 22, 1968, August 4, 1970.
The Los Angeles Times, June 16, 1946
Porterville, California Recorder, December 14, 1964.

StarWatch

Winter's Stars Start to Sizzle

Those long-awaited snowflakes have finally fallen on my hometown, and the dry spell has been broken although a significant deficit in precipitation still remains. November is always the month of transition. We've been fortunate this autumn with above-normal temperatures and many cloud-free and temperate nights. However as December dawns, so debuts the colder and cloudier weather season. It is also the dawning of the winter sky rising in the east at a more respectable hour. Yes, summer constellations like Lyra the Harp, Cygnus the Swan, and Altair the Eagle are still visible, crowding the heavens low in the west, but by 10 p.m., only Cygnus is left standing like a diminished cross in the northwest. * [Before moving to the eastern heavens and the winter constellations on the rise, make sure to witness the planet Venus and the Moon in the southwestern sky on Wednesday, December 4, between 5-6 p.m. A thin waxing crescent moon and the goddess of love, the second and third brightest sky objects will be in conjunction (together) low in the SW. Binoculars will make your observation more spectacular.]

* While the summer constellations are disappearing and the fall star patterns are headed westward, the eastern sky by 10 p.m. sizzles with the bright patterns of the winter group, Taurus the Bull, Auriga the Charioteer, the Gemini Twins, Orion the Hunter, and Canis Major and Canis Minor, the big and little dogs. In addition, there is brilliant Jupiter, the fourth brightest object of the night, positioned between the horns of Taurus. Ruddy Mars is a respectable 16 degrees above the horizon in Cancer the Crab. See a map showing the rising winter constellations at 10 p.m., and join some of the season's most luminous stars to form the famous asterism currently rising on its back. * Begin with Capella, of Auriga the Charioteer, to the right and slightly above Orion. A line segment stretching downward from Auriga's alpha star will intersect two bright luminaries relatively close together. You have come across the heads of the Gemini Twins, Castor (above) and Pollux. Down and to the right from Gemini will be the bright and solitary Procyon of Canis Minor, the Little Dog. Continuing right and following along the horizon will bring you to Sirius the Dog Star of Canis Major or the Big Dog. Move upward to the brightest star of the Hunter, blue supergiant Rigel (Orion's knee), and again up and towards the left to discover Aldebaran of Taurus the Bull. You can independently confirm Aldebaran's location by rocketing skyward from the three belt stars of Orion to this yellowish, giant star. Soaring downward from the belt is Sirius. * From Aldebaran, proceed earthward to the left shoulder of Orion, finding orangey (red supergiant) Betelgeuse. This path completes one of the versions of the Heavenly "G" rising on its side, a dazzling group of bright stars unlike any other. Use binoculars which gather more light than the human eye to reveal easily the colors of these stars in the northern heavens.

STARS OF THE HEAVENLY "G"	
Name of Star	**Brightness Rank**
Capella	6
Castor	23
Pollux	17
Procyon	8
Sirius	1
Rigel	7
Aldebaran	14
Betelgeuse	10

* Although the Heavenly "G" is visible from the Southern Hemisphere at mid-latitudes, it is not entirely above the horizon until 1 a.m., and when seen, the "G" is upside down and backward. It's just not the same. Ad Astra!

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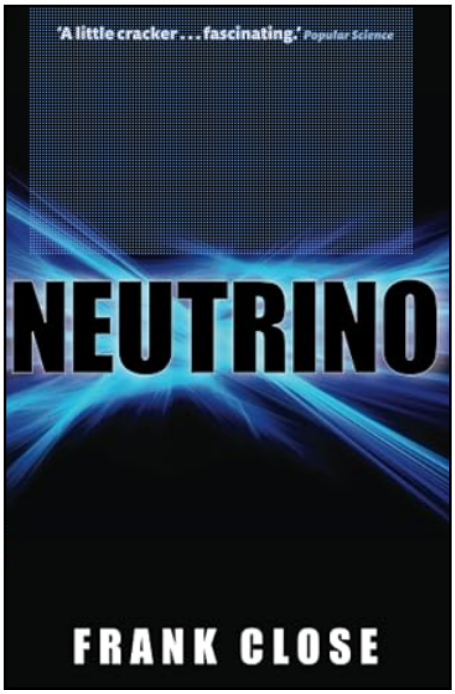

From the Library – Joe Zitarelli

"I have postulated a particle that cannot be detected."

-Wolfgang Pauli, 1930

I was walking through the library and spotted a book called *NEUTRINO*, by Frank Close, PhD. I thought to myself, this is a topic I really don't know much about; maybe I can learn something. When I started this book, I thought it was more of a physics book, and I would choose another book to review for LVAAS. But then I started reading the November 2024 issue of *Astronomy* with its cover stating, "Everything We Know About the Sun", and feature article "Bringing the Sun to Light." The article featured neutrinos, named by Enrico Fermi as "little neutrons" prominently throughout and I was glad that I had read this book. Neutrinos and stars go hand in hand. So, the topic of neutrinos is indeed a topic appropriate for astronomers.

Let me start by saying this is not a textbook for graduate students with all the facts about neutrinos. This is more of a history book that tells the story from when they were first theorized, then onto the hunt, then to their discovery, more details such as there are multiple types of neutrinos, how great numbers are produced by a supernova explosion, and finally to how they are now being used to peer into the core of our sun. Neutrinos are now my favorite elementary particles having replaced quarks. I find them more interesting than charm quarks, but everyone is welcome to their own opinion.

When Wolfgang Pauli first proposed the neutrino in 1930, he was so sure that no one would be able to detect a neutrino that he wagered a case of champagne that "no one would be able to detect the beast". They have no charge, and if they have mass, it isn't very much. And they only seem to interact via the weak force, so we can't see them. While they don't travel at the speed of light, they do travel very close to it. So, they can travel across the entire visible universe without interacting with anything. As a matter of fact, millions pass through your body every second. They pass through the entire earth, or layers of the sun just as easily. Being a man of his word, when the neutrino was finally detected in 1956, Pauli made good on his offer and paid the case of champagne. But then things got strange. Part of the problem with their detection was experimental physicists were looking for neutrinos when they should have been looking for anti-neutrinos. There weren't as many solar neutrinos as theory had suggested. Was the theory wrong, or what were they missing? There are three types of neutrinos called electron neutrinos, muon neutrinos and tau neutrinos, along with each having a paired anti-neutrino. Didn't see that one coming. Of course, we can't forget that they oscillate. That is, they can change from one type of neutrino into another, and then back again. Didn't see that one coming either.

In the quest for finding and studying the neutrino, many physicists published some outstanding studies. And many physicists won a lot of prizes for the work they did. But if you want to be recognized for the work you do on neutrinos, you better be willing to be patient and wait a long time. Some would have gotten a share of a Nobel Prize for their work, but unfortunately, they passed away too soon, and their colleagues received the prize. Others were working in the Soviet Union and their work wasn't being translated and read in the West. The book covers all the great scientists involved in the search as well as the great detectors that were developed. It shows how modern scientists must work well with others and must be adept at getting funding and convincing others that they should get access to scant and valuable resources.

In some ways, the neutrino reminds me of gravitational waves. They were first proposed a long time ago, they were hard to detect, they are now accepted and are being measured routinely, the machines to detect them are massive and expensive, there continues to be more confirmational studies and many scientists are winning lots of big awards because of their research. I enjoyed the book *NEUTRINO* a lot. It was easy to read, required no advanced math, offered easy to understand diagrams (Feynman diagrams – but that's another book), presented a lot of information and was simply very interesting material. If you know of a similar book on gravitational waves, please let me know; I would love to read it.

Caldwell 101 (NGC 6744) - Imager: Dan Stern

Dan's notes:

Caldwell 101 (NGC 6744), an intermediate spiral galaxy, is very similar to our own Milky Way, although it is about twice as large. It has an elongated yellowish core with spiral arms littered with dust. It is one of the few large spiral galaxies in our galactic neighborhood. Similar to our Magellanic Clouds, it has a distorted companion galaxy, top left. It is said that if you were a spectator looking from Caldwell 101 towards the Milky Way, the view would be much like ours looking at them.

LAST CHANCE! **Price Dropped $1000!** **LAST CHANCE!**

Astrophotography Rig - Only out under the stars twice. Rig consists of Redcat 51 Gen 3 250mm F4.9 scope, Celestron StarSense Autoguider, 9x50 finderscope, ZWO EAF electronic focuser, ZWO ASI533MC Pro cooled color camera, 2" filter drawer with Moon and UHC filters, telescope heater strap with manual PWM temperature controller, Celestron AVX equatorial mount, external GPS receiver, (3) 12vdc power supplies, powered USB hub and Windows 10 laptop for equipment interface and image processing. $1800 bodhi.black@1791.com (267) 377–6229

2025

What are the Stats of your LVAAS Membership?

LVAAS PayPal link: https://www.paypal.com/donate/?hosted_button_id=FBP8Y5VX5QXNW

(remember to add a note with your name, and membership type)

If your information has changed:

Online information update form: https://form.jotform.com/233314308714147

Printable form:
https://lvaas.org/filemgmt_data/files/LVAAS_Membership_Renewal_Form.pdf

Complete instructions: https://lvaas.org/page.php?page=Renewing

Questions? email membership@lvaas.org

New members who joined after October 1st are paid up for the following year.
Regular: $45
Family: $65
Junior/Student: $15
Sustaining: $90

DECEMBER 2024

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
01	02	03	04	05	06	Astroimaging Meeting - 7:00 PM 07
First Quarter Moon 08 General Meeting / Holiday Party (tentative)	09	10	11	12	13	14
Full Moon 15	16	17	18	19	20	Winter Solstice 21
Deadline for submissions to the Observer 22 Last Quarter Moon	23	Christmas Eve 24	Christmas Day 25	26	27	28
LVAAS Board of Governors Meeting 29	30	New Year's Eve 31				

JANUARY 2025

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			01	02	03	04
05	First Quarter Moon 06	07	08	09	10	11
General Meeting 3:00 PM Muhlenberg College 12	Full Moon 13	14	15	16	17	18
Deadline for submissions to the Observer 19	20	Last Quarter Moon 21	22	23	24	25
LVAAS Board of Governors Meeting 26	27	28	29	30	31	

Sky Above 40°33'58"N 75°26'5"W Sunday DEC 01 2024 00:00 UTC

Your Sky was implemented by John Walker in January and February of 1998. The calculation and display software was adapted from Home Planet for Windows. The GIF output file generation is based upon the ppmtogif module of Jef Poskanzer's pbmplus toolkit, of which many other components were used in creating the images you see here.

ppmtogif.c - read a portable pixmap and produce a GIF file

Based on GIFENCOD by David Rowley

Lempel-Zim compression based on "compress"

Modified by Marcel Wijkstra

Customize *Your Sky at* http://www.fourmilab.ch/yoursky/

2024 LVAAS EVENT CALENDAR

Contributed by Bill Dahlenburg

2024 LVAAS Event Calendar

	Sundays			Saturday		Observer	Moon Phase			
	General Meeting time	location	Board meeting	Astro-Imaging	Star Parties	Stargazers Group	Submission Deadline	New	1st	Full	3rd
January	14	3:00 PM Muhlenberg	28	no meeting	no meeting	no meeting	1/21/24	11	17	25	3
February	4	3:00 PM Muhlenberg	25	no meeting	no meeting	no meeting	2/18/24	9	16	24	2
March	10	3:00 PM Muhlenberg	24	no meeting	16	8	3/17/24	10	17	25	3
April	14	7:00 PM S.M.	28	6	13	12	4/21/24	8	15	23	1
May	5	7:00 PM S.M.	19	11	18	10	5/12/24	7	15	23	1 30
June	9	7:00 PM S.M.	30	1 29	15	14	6/23/24	6	14	21	28
July	13/14	5:00 PM S.M.	28	x	20	12	7/21/24	5	13	21	27
August	10/11	7:00 PM Pulpit	25	3 31	17	9	8/18/24	4	12	19	26
September	8	7:00 PM S.M.	29	x	14	13	9/22/24	2	11	17	24
October	13	7:00 PM S.M.	27	5	12	11	10/20/24	2	10	17	24
November	10	2:00 PM S.M.	24	2	9	8	11/17/24	1	9	15	22
December	8	2:00 PM ?	29	7	no meeting	no meeting	12/22/24	1 30	8	15	22

July, Aug & Dec are Saturday meetings with rain date on Sunday
Jan, Feb & March meetings are at Muhlenberg College
August meeting is at Pulpit Rock
December meeting / Holiday Party (TBD)

NEAF	4/20 - 4/21
Mega Meet	8/9 - 8/11
CSSP	6/6 – 6/9
Stellafane	8/1 – 8/4
BFSP	October 4-5-6?

Publishing images is a balancing act!

When preparing your images for publication in The Observer, please consider the following guidelines:

Put the quality in:

- Considering the "print" size of the image, make sure you have at least 150 pixels/inch.
- Use a reasonably good quality for the JPEG compression ratio.

But watch the "waistline"!

- Don't go too much above 200 pixels/inch max.
- Use the lowest JPEG quality that still looks good!
- Shoot for <300KB for a 1/2 page image or <600KB for a full page.

Tip: If you're not Photoshop-savvy, you can re-size and compress undemanding images ("human interest" not astroimages), with an online tool such as: https://www.ivertech.com/freeOnlineImageResizer/freeOnlineImageResizer.aspx. It will also tell you the pixel size and file size of your original, even if you don't download the processed copy.

The Observer is the official monthly publication of the Lehigh Valley Amateur Astronomical Society, Inc. (LVAAS), 620-B East Rock Road, Allentown, PA, 18103, and as of June 2016 is available for public viewing. Society members who would like to submit articles or images for publication should kindly do so by emailing *The Observer* editor, France Kopy, at observer@lvaas.org.

Astroimaging Director, Tom Duff is our new Astroimaging editor, and welcomes all image submissions.

Articles submitted prior to the Sunday before the monthly meeting of the board of governors (please see calendar on website) will appear in the upcoming month's issue. Early submissions are greatly appreciated. PDF format is preferred. Articles may be edited for publication. Comments and suggestions are always welcome.

LVAAS members please feel free to submit ads for astronomy equipment you have for sale, and additionally you may sponsor a maximum of three ads from non-members per year. Please submit your finished ad as a PDF, with pictures and text**.** Every attempt will be made to include submissions in a timely manner.

Every effort will be made to properly credit the sources of the material used in this publication. If additional credit is required, please notify the editor.

If you are interested in becoming a member of LVAAS, please visit our membership page for information on applying. Existing members please update your LVAAS profile information by emailing the membership director at membership@lvaas.org .